

Fishfinders

The Furuno LS6100 and Garmin 240 Blue finish one-two in our look at six units from \$300 to \$400. We tested at three water depths and evaluated screen visibility at day and at night.

Modern scanning sonar equipment has lots of names and just as many uses. The names: fishfinders, bottom machines, echo sounders, depthsounders or just plain sounders. They all do the same thing—use sound waves to look through the water and paint us a picture on a display screen of what's below. The uses: navigate the depths—or the shallows—to avoid hitting rocks or the bottom, determine bottom composition and contours for anchoring, locate where the fish should be (that secret spot), or simply to find fish.

Sonar selection and usage can get confusing, with lots of options. But no matter what you need a sonar machine for, you'll need to know the answers to some of the basic questions. Which transducer frequency should I use? How much resolution do I need? How much power do I need? Where should I set the Gain? What the heck is that upside-down crescent shape on the screen? These are just some of the questions posed by both novice and experienced boat owners. And finally, which unit offers the best bang for the buck?

Let's start with a quick overview of how sonar equipment works. First, it sends a pulse of sound down, via the transducer, which bounces off objects in the water, like rocks, wrecks and fish. Second, it measures the time that sound pulse takes to return. Finally, it uses that information to show us a screen display. Sound waves reflect best off objects with densities different than the water's. So rocks, mud, metal and the air-filled swim bladders of fish

all show up well. Everything on the screen is history, stuff you have already passed.

We also need to talk about how variables such as power output, transducer selection, screen type, screen resolution, and certain functions can affect a finder's performance.

Let's start with screen type. All the units we tested have monochrome LCD screens. In the under-\$400 range, these screens dominate the marketplace. The LCD screens are lighter, require less power and are easier to waterproof than a comparable CRT screen. The latest improvements in LCD technology, such as glare-reducing coatings and internal backlighting, make these screens easy to see even in direct sunlight. The older-technology CRT screens are made of glass, require more power, may need a hood to make the screen readable in direct sunlight, and are bigger and heavier than a comparable-sized LCD.

Screen resolution is normally expressed in a horizontal and vertical pixel count, such as 234 x 320. This means 234 dots make up each horizontal line of the screen, and 320 dots comprise every vertical line. The horizontal pixel count tells you how much history your screen will show and how much screen



Above: A 25' Contender center console served as our testing platform. Transducers were all set to a frequency of 200 kHz. Note that we examined each machine's picture in a side-by-side comparison as the boat moved over the targets below.

space you will have for split-screen functions. We'll talk about some of them later.

The higher the vertical pixel count, the better the machine will be able to show a distinction between the sea bed and fish, especially in deep water. Here's why: Let's say you're scanning in 20' of water on a unit with 320 pixels of vertical resolution. Each pixel rep-

resents less than an inch of water depth, which means the machine should easily show even a small fish just a few inches off the bottom. Try the same thing in 300' of water. Now each pixel represents about a foot of depth, which necessitates the use of resolution-enhancing split screen functions to distinguish between fish and bottom.

We'll briefly describe four major functions that increase a fishfinder's usefulness: bottom lock, zoom, A-scope and whiteline. Bottom lock and zoom increase the screen resolution by showing only a portion of the water column on the screen. All the machines tested have zoom, but only the Furuno and Raymarine products have true bottom lock. The Humminbird Legend 2000 has a mode called bottom lock, but it could better be described as bottom zoom.

A-scope, called RTS (Real Time Sonar) by Humminbird, shows in real time what is directly under the transducer. All except the Garmin and Lowrance have this function. As the machine receives information and writes a new vertical line of pixels to the right side of the screen, it also shows this information expanded horizontally as a split-screen. This horizontal expansion allows your eye to easily view this information.

Whiteline, referred to as Greyline by Lowrance, changes the way a machine displays the bottom echoes. With Whiteline activated, the bottom will show up as a thin black line under which varying depths of white or gray indicate strong or weak echoes. This makes it easier to determine bottom hardness and differentiate between bottom and objects close to the seabed.

The maximum power output of most recreational depth sounders is between 100 and 1,000 watts of RMS (root mean square) power. The definition of RMS power isn't important here. In this case, we can take it to mean an average continuous power output. More power generally helps a machine work better in deeper water.

Transducers may vary from a pre-packaged unit selected specifically for that machine to numerous options. There are transom-mount, thru-hull and shoot-thru units (usually both come in plastic or bronze). All of our test units had optional transducers available, usually at an added cost. Frequencies from 28kHz to 455kHz are common, and some provide speed and water temperature data. They vary from nearly the size of a football to smaller than a hockey puck. Lower frequencies penetrate deep water better, while higher frequencies show better detail. Some units are available with more than one frequency installed; three of the units we tested fall into this category, being dual frequency.

Your big transducer decision? Determining how big a hole you want to drill in your boat. Thru-hull transducers require the largest holes and have the most complicated installations, sometimes best left to a professional. A transom mount generally only requires a few screw holes. This is the type of transducer we requested from each manufacturer for testing. Shoot-thru transducers are normally epoxied to the inside of the hull to avoid drilling, but they cannot be used on all boat

hulls. Performance wise, thru-hulls generally edge out a transom mounts and both generally outperform shoot-thru units.

Did you ever notice how nearly all manufacturers advertise their machines showing the screen loaded with inverted crescent-shaped targets, each signifying a large fish? In real life this will rarely be the way your machine displays fish—it just requires too many variables to be perfectly in sync. But here are a couple of operational tips that can help you use your machine more effectively. Auto is a good starting point for the novice or cruiser; a fisherman will eventually end up using manual gain to fully control the picture. Manual gain control is available on nearly all echo sounders and you should learn to use it. The gain allows the machine's receiver to let in more or less energy from the transducer-sent sound wave. Without enough energy, you won't mark anything, and if you let in too much you'll mark everything. Neither is a good situation.

Here are two ways to set the gain manually; try them and see which you prefer. First, let's say you're in 50' of water and want to scan for bottom fish. Set your depth range to



Above: Our shallow-water target was this fiberglass boat that sits in about 7 feet of water. Each of the six units marked the wreck, but differences in clarity and accuracy were noted.

Value Guide: Fishfinders

Maker	Model	Price	Screen (inches) Horiz. x Vert.	Dimensions (inches)	Transducer Frequency	Rated Output Power (RMS)
Furuno	LS6100	\$359.00	3.5 x 4.7	7.7H x 7.2W x 3.3D	50/200 kHz	300 W
Garmin	240 Blue	\$349.00	3.3 x 3.3	4.9H x 6.3W x 3.0D	50/200 kHz	500 W
Humminbird	Legend 2000	\$339.00	3.6 x 3.6	4.8H x 6.2W x 2.8D	200 kHz	500 W
Lowrance	X71	\$299.00	3.6 x 3.6	5.4H x 6.9W x 2.9D	200 kHz	188 W
Navman	4200	\$179.00	2.4 x 3.6	5.0H x 5.0W x 2.0D	200 kHz	150 W
Raymarine	L470	\$379.00	3.8 x 3.8	5.3H x 6.6W x 2.8D	50/200 kHz	500 W

at least 120'. Now increase your gain until you begin to get a second bottom echo at 100'. Now reselect a depth range closer to 50 feet and you're set. The second and slightly simpler method is to increase the gain until you begin to see "noise" in the water column, then you back off the gain slightly.

What We Tested

We tested six fishfinders. The Furuno LS6100, the Garmin 240 Blue, the Humminbird Legend 2000, the Lowrance X71 and the Raymarine L470 fall into our target price range of \$300 to \$400 and represent one of the large marine electronics manufacturers. The sixth unit, the Navman 4200, sells for less than \$200 but with its accompanying fuel meter option costing \$150 it falls right in the middle of our price range.

How We Tested

Even the best sounder in the world is of little use if you can't see the screen easily and clearly under all conditions. Each machine was given two ratings for "viewability," one for day and one for night. For the day rating, we viewed each machine on our test boat (a 25' Contender) from a normal operating distance in full sunlight, shade, and with and without polarized sunglasses. The night rating was done inside under darkened conditions. All machines were operated simultaneously side by

side in simulator mode and adjusted for the best possible display during each test.

On-the-water testing was done in warm (85-90F) salt water using the transom-mount transducer selected and supplied by each manufacturer. All testing was done using 200 kHz. Three machines had the capability to use 50 kHz as well, but we did not test at this frequency. Testing was accomplished by making multiple passes over known bottom structures in various depths. Our shallow-water test was done in about 7' over a small fiberglass boat wreck. Mid-depth testing was done over a large steel ship sunk in 120', and the deep-water evaluation was carried out while drifting over a steel structure in 290' of water. We set each unit to the Auto mode and adjusted the gain only as necessary.

All of the units identified the marks in each of our three test depths, but there were differences. Our "on-water" performance ratings indicate how accurately and clearly each machine displayed those images.

Each unit was assigned a score for "ease of use." A unit earned a high score if our tester could operate most functions easily without reference to the manual. If even simple functions required constant manual review, scores were lower.

The warranty on each machine is listed in the accompanying table

in years for both parts and labor coverage.

We did not test the fuel monitor option for the Navman unit, nor did we test the basic navigation capability of the Furuno unit. Our testing stuck with factors that influence the performance of the unit's sounder. Our test rig precluded any high-speed testing. The performance of any sounder is best at slow speed, with high-speed performance based mostly on proper transducer installation. One should expect some decrease in performance at higher speeds, even with a good installation. We did not rate installation difficulty; installation would be similar for each unit based on the type of mounting selected—bracket or flush. All units can be flush-mounted. Additional install factors include the unit's location on the vessel, the type of transducer, and the distance to appropriate electrical connections. Power consumption stated by the manufacturer for each unit was minimal, listed as one amp or less for all units tested.

Furuno LS-6100

This is the largest unit we tested; it has the biggest screen and the most diverse menu of options. When purchasing this unit, you must select a transducer. The Furuno unit was supplied with an Airmar P66 transom mount transducer with speed and water temperature included,

Resolution Horiz. x Vert.	Warranty: Parts/Labor	Features			
		A-Scope	Whiteline	Bottom Lock	Variable Zoom
240 x 320	2 years/1 year	Yes	Yes	Yes	Yes
240 x 240	1 year/1 year	No	Yes	No	Yes
240 x 240	1 year/1 year	Yes	Yes	No	Yes
160 x 160	1 year/1 year	No	Yes	No	Yes
120 x 160	1 year/2 years	Yes	No	No	Yes
128 x 240	2 years/2years	Yes	Yes	Yes	Yes

which sells for \$80.00. When added to the \$279.00 price of the display unit, the total was \$359.00, well within our price range.

The LS-6100 is a dual-frequency unit with 300 RMS watts of power output and the highest resolution screen of any unit tested. It performed well in all testing and carries an above-average warranty. Deep-water testing was done in Auto mode with the frequency set to 200kHz. The unit showed good detail of the wreck in the deep-water test, and we would expect it to read the bottom in far deeper water using its 50 kHz capability.

Screen backlighting in the Furuno evenly illuminates the entire screen and has 10 levels of ad-

justment. Some of the features found on the Furuno include user-adjustable depth ranges, two auto modes (one for cruising and one for fishing), a reverse video option for night viewing, auto gain offset (which allows you to tweak the gain even when it's in auto mode), separate gain adjustments for each frequency, and multiple inputs for speed and temperature. This is just a sampling of some of the features most of the other machines tested do not possess.

Bottom Line: A brawny machine with all the bells and whistles of a much more expensive fishfinder. It's our top pick and Best Buy.

Garmin 240 Blue

This mid-size unit carries a smaller-

than-average screen (though with good resolution) and an intuitive menu. The Garmin fishfinder package comes with the same Airmar P66 transducer as the Furuno, but the speed and temp sensors are supplied in a separate transom-mount unit. Screen backlighting in the Garmin is bright and evenly illuminates the entire screen. It has 11 levels of adjustment. On the water performance of this dual frequency 500 RMS watt machine was equal to the Furuno in all tests, and like the Furuno we would expect this machine to be useful in much deeper water than the maximum depth we tested.

Bottom Line: The Garmin lacks some of the features found in the Furuno unit but is a robust performer, and our second choice. If you don't have the room for the Furuno this is the machine for you.

Humminbird Legend 2000

The Legend 2000 is a middle-of-the-pack machine, size-wise, screen-wise and performance-wise. It is a single frequency unit with 500 RMS watts of power and a smaller transducer than the other high-power machines. The speed and temp sensors are included but supplied in a separate transom-mount unit.

On the deep-water test it really ran out of gas; we had to use full gain to mark the wreck and, in our

Performance: Fishfinders

Unit	Shallow-water Performance	Mid-depth Performance	Deep-water Performance	Day-view Rating	Night-view Rating	Ease of Use
Furuno	Good	Excellent	Good	Good	Excellent	Good
Garmin	Good	Excellent	Good	Excellent	Excellent	Good
Humminbird	Good	Good	Poor	Fair	Fair	Good
Lowrance	Good	Good	Fair	Good	Fair	Good
Navman	Fair	Fair	Poor	Poor	Poor	Fair
Raymarine	Good	Good	Fair	Good	Good	Good

opinion, wouldn't expect this unit to read much deeper. The screen on the Legend 2000 is just not as bright and easy to see as some of the other



Above: The Humminbird's display wasn't as easy to see as some of the others.



Above: The Garmin 240 Blue is the machine for you if you lack the room for the Furuno.



Above: The Furuno LS6100, our Best Buy, packs the most features into an intelligently designed unit.

units. Plus the backlighting emanates from the right-hand side of the screen and illuminates it unevenly. Unlike the others, control of the Legend 2000 is done with knobs rather than push buttons. We prefer the instant access to the gain control the knob allows.

Bottom Line: The machine has potential, but in our opinion it needs a better transducer and some tweaking of the screen to be competitive in this price range.

Lowrance X71

This is another middle-of-the-pack machine both in size and performance. It is a single-frequency machine with 188 RMS watts of power. The supplied transducer is on the smallish side, with a temperature sensor included. The speed sensor is optional. Screen resolution is the lowest in its class at 160 x 160, producing a somewhat blocky appearance. As with the Humminbird, the screen's illumination originates from the right and was uneven. It has no level adjustment, just on or off. Tonal quality is not on par with the better units in this group, and the screen really has just two tones, black and white. It achieves a middle gray tone by rapidly turning the selected pixels on and off.

Even though it had a small transducer and relatively low power output, this unit did mark the wrecks, even in the deep-water test. But the display itself is not nearly as good as the Furuno and Garmin's. We sent our comments to Lowrance. We did not receive a response.

Bottom Line: We think this machine is too expensive for what you get.

Navman 4200

This is the smallest and least expensive unit tested. The 4200 is packaged with a small transducer, which includes both a speed and temp sensor. It is a single frequency unit with 150 RMS watts of power.

It performed adequately for a machine in its price range, but had

a glitch. Whenever the machine painted a hard bottom structure, like the test wrecks, it would blank out part of the display beneath the structure, causing a loss of detail in the picture. This can be seen in the accompanying photo. The screen also has a major flaw that led to the poor ratings on both day and night view testing—it flickers. This did not occur all the time, but it was a problem during testing. We don't know if the machine picked up interference from the test boat's electrical system, but we do know none of the other units hooked up to the same power supply had the problem. The backlighting comes from one side of the screen, illuminates unevenly, and is extremely dim.

Rus Graham, V.P. of marketing at Navman USA, Inc., reviewed our comments on the 4200 and, after talking with Navman engineers, had these comments on the three main issues we raised. Regarding the screen blank out he said, "Bottom blanking was developed to reduce entry-level user confusion with unnecessary data. Based on user tests, this feature was not embraced by more seasoned users, and engineering scheduled the removal of the feature." He addressed the backlighting and screen flicker issues by saying, "At the same time we cut over to the new version of BIOS, we will introduce our second generation of backlighting. It will incorporate a new diffuser to more evenly spread light across the screen and increase its overall brightness. The screen flicker you experienced is less straightforward. Based on our tests and observations, engineering believes that our display performs comparably to competitors' displays at a similar price point."

Bottom Line: We would wait until Navman makes the changes outlined by Mr. Graham before considering this unit.

Raymarine L470

This is the most expensive unit tested; it's about average size, but

has one of the larger screens. Too bad the resolution at 240 x 128 is well below the best units. The L470 came equipped with an Airmar P65 transducer, which includes speed and temperature sensing. It is a dual-frequency unit with 500 RMS watts of power and an abundance of features.

Like the best units tested, the backlighting evenly illuminates the complete screen and has six levels of adjustment, but even at its brightest it failed to equal the Garmin and Furuno.

Two quirky things about the machine we don't like: First, the mounting bracket is not secure enough and picks up any boat vibration that may be present. It's a non-issue if you flush-mount. Second, the cable connections are the push-in types that use an O-ring lock. We'd rather see a positive mechanical lock as featured on most of the other units. On the plus side, the warranty is the best of the six tested products.

We asked Raymarine to review our comments.

Said product line manager Morton Andreason said: "Although I don't disagree with most of your conclusions, the product is obviously getting a little dated. I do feel the review focused too much on the negative aspect of the product and ignores many of the unique strengths of the L470." (He mentioned the 500W RMS of power at both frequencies and PVDF Sidelooker transducer option, which he said "offers the best Sidelooker option in the industry.")

Bottom Line: At this price, we'd expect a secure bracket and better screen resolution. This unit only has around half the total pixels of the Garmin and about 40% of the Furuno.

Conclusions

To get the most bang for your buck when purchasing a depth sounder, the little things one unit does—and another doesn't—makes a world of difference. But before you even go that far you must decide the spe-

cific use you have in mind for your sounder. If you're a cruiser who never fishes, any of the units tested will—in automatic mode and with a properly installed transducer—give a constant depth reading to their respective limits. However, they vary greatly in their viewability under different lighting conditions, and this can be difficult or impossible to judge in a store when initially viewing them under fluorescent lighting. This is why we stressed the viewability so heavily in our testing and commentary.

A fisherman will not only care about viewability but performance and features. This leads us to the conclusion that our winning machine must excel in all three areas—which is why we rated the Furuno LS-6100 our top pick for both cruising and fishing. Its superior screen, good performance, and depth of features puts it over the top. If you don't have the room for the Furuno, we recommend our runner-up, the Garmin. ■

Contacts—Furuno USA, Inc., 4400 NW Pacific Rim Blvd. Camas, WA 98607; 360.834.9300; www.furuno.com.

Techsonic Industries, Inc., 108 Maple Ln., Eufaula, AL 36027; 334/687-6613; www.humminbird.com.

Navman USA Inc., 18 Pine Street Ext., Nashua, NH 03060; 603/577 9600 (outside US and Canada, 866/628-6261); www.navman.com.

Raymarine, 22 Cotton Rd., Unit H, Nashua, NH 03063; 603/881-5200; www.raymarine.com. **Garmin International, Inc.,**

Olathe, KS 66062; 913/397-8200; www.garmin.com. **Lowrance Electronics,** 12000 East Skelly Dr., Tulsa, OK 74128; 800/324-1356; www.lowrance.com. **Airmar Technology Corp.,** 35 Meadowbrook Dr., Milford, NH 03055; 603/673-9570; www.airmar.com.

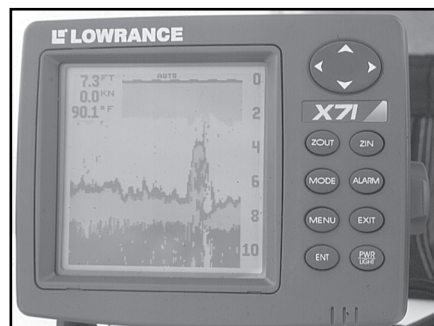
Editor's Note: In our research for this project we discovered a recall on some Airmar products supplied with certain Raymarine units. Check the Airmar website (www.airmar.com) for details.



Above: The Raymarine L470 was a mixed bag. The pluses: a host of features, an evenly illuminated screen, plenty of power, and a very good warranty. The minuses: It's the most expensive of those tested, it needs a more secure mounting bracket, and it has low resolution compared to most others.



Above: We don't recommend the Navman because its screen flickered during our tests. Also, note that the display has blanked out part of the picture beneath the target structure, causing a loss of detail.



Above: Only the low-priced Navman had lower screen resolution than the Lowrance X71. The display looked blocky to us.